

Amended Claims

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1. (Currently amended) A method for repairing inoperative pixels in a liquid crystal micro-display built on a silicon integrated circuit substrate, said substrate having an integral complimentary metal-oxide semiconductor (CMOS) control chip containing CMOS drive circuitry, comprising:

identifying defective CMOS drive circuitry for the inoperative pixel after fabrication of said CMOS control chip;

disconnecting the defective drive circuitry from the inoperative pixel; and

connecting the inoperative pixel to a working drive circuit of a nearby pixel, said nearby pixel comprising one of an adjacent pixel or a non-adjacent pixel.

2. (Original) A method in accordance with claim 1, wherein the step of connecting the inoperative pixel to a working drive circuit of a nearby pixel further comprises:

providing additional circuitry associated with each pixel in the display, which circuitry connects the inoperative pixel to the working drive circuit of a nearby pixel.

3. (Original) A method in accordance with claim 2, wherein the additional circuitry comprises a bypass bit latch, such that when the bypass bit is set, the defective drive circuitry is bypassed and the inoperative pixel is driven from the working drive circuit of a nearby pixel.

4. (Original) A method in accordance with claim 3, wherein the bypass bit is loaded from an external memory after the display is turned on.

5. (Original) A method in accordance with claim 3, wherein the

step of providing additional circuitry further comprises:

    multiplexing the drive circuits of each pixel with the drive circuit of a nearby pixel.

6. (Original) A method in accordance with claim 3, wherein the additional circuitry further comprises:

    a tri-state transistor associated with each pixel connected to the bypass bit latch; and

    a resistor coupling neighboring pixels;

    such that when the bypass bit is set, the transistor is switched to bypass the defective drive circuitry so that the inoperative pixel is driven from the working drive circuit of a nearby pixel through the resistor.

7. (Original) A method in accordance with claim 2, wherein the additional circuitry comprises:

    a resistive connection between neighboring pixel metal layers;

    wherein disconnecting the defective drive circuitry is accomplished by severing a via connecting the defective drive circuitry to the inoperative pixel, such that the inoperative pixel is driven by a nearby pixel through the resistive connection.

8. (Original) A method in accordance with claim 7, wherein the via is severed by one of laser ablation, melting or ablation of a fusible link by passing sufficient current through it, selective chemical etching using a photoresist or other selection means, melting or ablation with an electron beam, melting or ablation with a focused microwave or other electro-magnetic beam, electro-ionic erosion, or physical cutting or removal of the metal using a sharp or abrasive implement or probe.

9. (Original) A method in accordance with claim 2, wherein the additional circuitry comprises:

a capacitive connection between neighboring pixel metal layers;

wherein disconnecting the defective drive circuitry is accomplished by severing a via connecting the defective drive circuitry to the inoperative pixel, such that the inoperative pixel is driven by a nearby pixel through the capacitive connection.

10. (Original) A method in accordance with claim 9, wherein the via is severed by one of laser ablation, melting or ablation of a fusible link by passing sufficient current through it, selective chemical etching using a photoresist or other selection means, melting or ablation with an electron beam, melting or ablation with a focused microwave or other electro-magnetic beam, electro-ionic erosion, or physical cutting or removal of the metal using a sharp or abrasive implement or probe.

11. (Original) A method in accordance with claim 1, wherein the pixels are repaired in groups.

12. (Original) A method in accordance with claim 1, wherein identifying defective drive circuitry comprises the further step of providing test circuitry associated with the display.

13. (Original) A method in accordance with claim 1, wherein the pixel drive circuitry associated with each pixel is located separately from each pixel.

14. (Cancelled).

15. (Currently amended) A liquid crystal micro-display apparatus capable of repairing inoperative pixels, comprising:

a plurality of pixels;

a complimentary metal-oxide semiconductor (CMOS) control chip integral to a silicon integrated circuit substrate of said micro display, said CMOS control chip containing CMOS drive circuitry for controlling the pixels;

means for disconnecting defective CMOS drive circuitry from an inoperative pixel after fabrication of said CMOS control chip; and

means for connecting the inoperative pixel to a working drive circuit of a nearby pixel, said nearby pixel comprising one of an adjacent pixel or a non-adjacent pixel.

16. (Original) Apparatus in accordance with claim 15, wherein the means for connecting the inoperative pixel to a working drive circuit comprises:

additional circuitry associated with each pixel in the display, which circuitry connects the inoperative pixel to the working drive circuit of a nearby pixel.

17. (Original) Apparatus in accordance with claim 16, wherein the additional circuitry comprises a bypass bit latch, such that when the bypass bit is set, the defective drive circuitry is bypassed and the inoperative pixel is driven from the working drive circuit of a nearby pixel.

18. (Original) Apparatus in accordance with claim 17, wherein the bypass bit is loaded from an external memory after the display is turned on.

19. (Original) Apparatus in accordance with claim 17, wherein the additional circuitry further comprises:

multiplexing circuitry associated with the bypass bit latch.

20. (Original) Apparatus in accordance with claim 17, wherein the additional circuitry further comprises:

a tri-state transistor associated with each pixel connected to the bypass bit latch; and

a resistor coupling neighboring pixels;

such that when the bypass bit is set, the transistor is switched to bypass the defective drive circuitry so that the inoperative pixel is driven from the working drive circuit of a nearby pixel through the resistor.

21. (Original) Apparatus in accordance with claim 16, wherein the additional circuitry comprises:

a resistive connection between neighboring pixel metal layers;

wherein the defective drive circuitry can be disconnected from the inoperative pixel by severing a via connecting the defective drive circuitry to the inoperative pixel, such that the inoperative pixel is driven by a nearby pixel through the resistive connection.

22. (Original) Apparatus in accordance with claim 21, wherein the via is severed by one of laser ablation, melting or ablation of a fusible link by passing sufficient current through it, selective chemical etching using a photoresist or other selection means, melting or ablation with an electron beam, melting or ablation with a focused microwave or other electro-magnetic beam, electro-ionic erosion, or physical cutting or removal of the metal using a sharp or abrasive implement or probe.

23. (Original) Apparatus in accordance with claim 16, wherein the additional circuitry comprises:

a capacitive connection between neighboring pixel metal layers;

wherein the defective drive circuitry can be disconnected from the inoperative pixel using by severing a via connecting the defective drive circuitry to the inoperative pixel, such that the inoperative pixel is driven by a nearby pixel through the capacitive connection.

24. (Original) Apparatus in accordance with claim 23, wherein the via is severed by one of laser ablation, melting or ablation of a fusible link by passing sufficient current through it, selective chemical etching using a photoresist or other selection means, melting or ablation with an electron beam, melting or ablation with a focused microwave or other electro-magnetic beam, electro-ionic erosion, or physical cutting or removal of the metal using a sharp or abrasive implement or probe.

25. (Original) Apparatus in accordance with claim 15, wherein the pixels are repaired in groups.

26. (Original) Apparatus in accordance with claim 15, further comprising test circuitry to identify the defective drive circuitry.

27. (Original) Apparatus in accordance with claim 15, wherein the pixel drive circuitry associated with each pixel is located separately from each pixel.

28. (Cancelled).

29. (Previously presented) A method in accordance with claim 1, wherein said defective CMOS drive circuitry is identified after

the CMOS control chip and the liquid crystal material are assembled together.

30. (Previously presented) A method in accordance with claim 29, wherein said inoperative pixel is identified via an optical inspection of the display after assembly of said display.

31. (Previously presented) Apparatus in accordance with claim 15, wherein said defective CMOS drive circuitry is identified after the CMOS control chip and the liquid crystal material are assembled together.

32. (Previously presented) Apparatus in accordance with claim 31, wherein said inoperative pixel is identified via an optical inspection of the display after assembly of said display.

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